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ABSTRACT

This document reviews the research linking excessive exercise with eating disorders. Seven steps are listed that an individual follows in going from someone who starts out using exercise and aerobic dance as a stress management technique or a hobby to becoming an exercise dependent individual with addictive behavior. Studies are reviewed, the results of which suggest that while exercise participants and aerobic instructors are generally "healthy" from an eating disorder and body image standpoint, there is a significant minority of underweight participants and instructors who overestimate their body size and have tendencies toward anorexia nervosa and bulimia. It is recommended that those interested in organizing and conducting exercise and fitness programs be concerned by the results of these studies. Included in the document are tables describing red flags for eating disorders, distinguishing features of the athlete/fitness participant, and distinguishing features of the athlete/exercise anorectic/bulimic; danger signs for physicians/researchers and for coaches/fitness instructors; and tips for prevention of eating disorders. Publications on eating disorders that have come from research in the sport and athletic area are recommended. (NB)

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RECENT RESEARCH ON EATING DISORDERS AND BODY IMAGE DISTORTION AMONG AEROBIC INSTRUCTORS AND EXERCISE PARTICIPANTS

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Eating disorders are sometimes referred to as a "diet and fitness program gone wild!" (Moriarty and Moriarty, 1988). As pointed out by Dr. Andrew Brodman, psychiatrist at Massachusetts General Hospital at Boston in The Physician in Sports Medicine, Nov., 1985:

> Excessive exercise has always been a feature of eating disorders, even before eating disorders became as prevalent as they are today. With the explosion of exercise over the past twenty years, people who previously exercised alone in their room may now exercise in an organized fashion because it is more socially acceptable than it used to be. It is also a way to channel their excessive need to exercise. So you may see more eating disorders among people engaging in exercise. (Brodman, 1985: 94)

Therapist Patty Perry, Director of the Eating Disorder Clinic Inc. of Toronto, believes that the marketing of fitness has something to do with the increase in eating disorders.

> As female consumers of fashion or fitness, we are comparing ourselves to stereotypes that are often quite disturbed in eating and exercise habits. For example, Jane Fonda has the thin, fit body women desire, but this is the result of bulimia as a teenager, abuse of speed and diuretics to stay model-svelte until her early thirties, and involvement and promotion in excessive weight control up to the present. We sell fitness as an unmixed blessing, but this is not the case. Indeed, the fad proportion of fitness may be contributing to eating disorders. Women are trying to achieve weight control through overexercise. It's not true that the more you do the more it does for you. (Hooked on Perfection, Verve, August/September, 1986: 79-80).

Perry goes on to point out that those who take fitness/sport too far may be called 'obligatory exercisers'. They behave in a way similar to eating disordered athletes in that they must have an exercise fix

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before they allow themselves to eat anything, use exercise to burn off calories, and will not stop even if they are exhausted or injured. For them, exercise is an excessive and compulsive pursuit of the ideal body, not an activity that enhances wellbeing.

D.M.W. de Couberley Beale (1987), writing in the British Journal of Addiction, lists post diagnostic criteria for exercise dependence. Exercise dependent individuals start out to use exercise and aerobic dance as a stress management technique or a wholesome hobby; however, this leads to addictive behaviour in some individuals. This process includes the following steps:

1) An narrowing of the repertoire to a stereotype pattern of exercise;
2) The individual gives increased priority over other activities;
3) There is increased tolerance to the amount of exercise;
4) Withdrawal symptoms follow cessation of exercise, or even missing a single workout;
5) The individual seeks release of withdrawal symptoms by further exercise;
6) There is subjective awareness of a compulsion;
7) There is a rapid reinstatement of the previous pattern of exercise.

Associated features listed by Beale include continuation of exercise despite a serious physical disorder caused, prolonged or aggravated by exercise and/or increased argument or difficulty in the person's personal or professional life. Finally, the individual includes self inflicted loss of weight by dieting as a means to improve performance.

The exercise activity which started out as a solution to the problem has become the problem!

Research studies have shown that the incidence of eating disorders is much higher among children and youth involved in sports such as dance (Garner, 1983; Anthony, Wood & Goldberg, 1982); figure skating (Perry, 1986); gymnastics (Kostar, 1983; Rosen, 1987); middle distance and marathon runners (Katz, 1986; Yates, Leehey & Shisslak, 1983) and a variety of other activities such as swimming, diving, rowing, riding and wrestling (Black & Burckes-Miller, 1988; Burckes-Miller & Black, 1988 a & b; Leichner, 1986; Rosen, 1987).

Little research has been done to date on the incidence of eating disorders and body image distortion among exercisers and those who instruct them. Blumenthal, Rose and Chang (1985) provide a review of the relationship between anorexia nervosa and exercise. More recently Leichner, Rallo and Leichner (1989) at Douglas Hospital in Montreal conducted a study of attitudes and behaviour among exercising women, while Janice Rawlings (1989) and Christine Ford (1990) assessed the incidence of eating disorders and body image distortion among fitness instructors and members of the Ontario Fitness Council (OFC).

Leichner et al. (1989) studied eighty-five female volunteers from a community-based fitness program ('Feelin Fit' Company) which aims its program mainly at homemakers and working women. A series of questionnaires were utilized, including the Eating Disorder Inventory (EDI) (Garner, Olmsted & Polivy, 1983). The Rawlings study (1989) also utilized the EDI, while the Ford study (1990) utilized the Bulimic Test (BULIT) (Smith & Thelen, 1984). Both Rawlings and Ford utilized

Mable's (1989) Body Image Distortion questionnaire (BID) to assess the Ontario Fitness Council (OFC). The OFC is a professional association with membership made primarily of aerobic instructors and administrators from community programs. The Rawlings study was made up of 370 members (333 females and 37 males); while the Ford study had 150 respondents (130 women and 20 men). Since all three studies assessed the incidence of eating disorders and body image distortion, reporting of results here will focus on these parameters.

The results of the Leichner study on exercisers and the Rawlings study on instructors are reported in Table 1 - Mean Subscale Scores on EDI. The fitness group's study closely paralleled the female college reference group. All three (exercisers, instructors and college reference) were significantly healthier than the anorexic group. Although there is little to choose among these three groups, it should be noted that the aerobic instructors were the lowest on six of the eight subscales (drive for thinness, body dissatisfaction, ineffectiveness, interpersonal distrust, interoceptive awareness and maturity fears).

Table 2 - Number of Exercisers Scoring Equal or Greater Than the Mean for the Anorexia Nervosa Reference Group - reports the results of the exercisers in Leichner's study and the instructors in Rawlings's. The results are similar in terms of drive for thinness, bulimia and body dissatisfaction, the subscales which focus on behavioural characteristics associated with eating disorders. On the other hand, four of the other five subscales, which measure basic underlying psychological parameters, show some marked differences. Thus, a significantly higher percentage of exercisers scored higher on feelings of ineffectiveness, interpersonal

Table 1

Mean Subscale Scores on EDI

	Group			
Subscale	Exercisers[1]	Instructors[2]	College[3]	Anorexic[4]
Drive for Thinness	4.98	3.9	5.1	13.8
Bulimia	1.05	1.2	1.7	8.1
Body Dissatisfaction	9.88	6.6	9.7	15.5
Ineffectiveness	4.27	1.8	2.3	12.1
Perfectionism	4.70	5.7	6.4	8.6
Interpersonal Distrust	3.88	1.5	2.4	6.4
Interoceptive Awareness	3.52	2.0	2.3	11.4
Maturity Fears	2.67	1.1	2.2	5.6

[1]Leichner exercisers

[2]Rawlings OFC aerobic instructors

[3,4]Reference groups from Garner & Olmstead (1984)

Table 2

Number of Exercisers and Instructors Scoring > Mean for Anorexia Nervosa[1] Reference Group

		Proportion Scoring > Anorexia Nervosa Mean	
		Percent	
Subscale	Number	Exercisers[2]	Instructors[3]
Drive for Thinness	6	7.1	5.6
Bulimia	1	1.2	2.0
Body Dissatisfaction	11	12.9	12.4
Ineffectiveness	7	8.2	1.5
Perfectionsm	15	17.6	21
Interpersonal Distrust	21	24.7	7
Interoceptive Awareness	2	2.4	.6
Maturity Fears	18	21.2	3.5

N=85

[1]Reference group from Garner & Olmsted, 1984.

[2]Leichner exercise group

[3]Rawlings instructor group

distrust, interoceptive awareness and maturity fears. As Leichner points out, perfectionism (17.6%), interpersonal distrust (24.7%) and maturity fears (21.2%) were elevated for a relatively large proportion of the subjects, even though mean values for these subscales were not elevated relative to the female college reference group (see Table 1).

Table 3 - Means (Standard Deviations) and Planned Comparisons of Female Anorexic, College (Garner & Olmsted, 1984) and OFC Members (< 28 Years) - taken from the Rawlings study provides a comparison of the Ontario Fitness Council instructors with the both the anorexic and the college reference groups. As can be seen, the OFC members scored significantly lower than anorexics on all eight subscales. It is interesting to note that analysis showed that the OFC instructors scored significantly lower than even the college reference group on four of the subscales (drive for thinness, body dissatisfaction, interpersonal distrust and maturity fears).

Both the Leichner and Rawlings studies showed extremely low incidence of bulimia, with only 1.2% of the subjects reaching or exceeding readings for eating disordered individuals. On the other hand, the Ford (1990) study which focused on bulimia and utilized the Bulimic Test (BULIT) showed 4.6% exceeding the bulimia/nervosa score of 88. Of these 4.6%, 0.8% were considered to have bulimic tendencies (with scores between 88-101) and the remaining 3.8% were considered to be diagnosed as clinically bulimic.

Ford (1990) provides interesting results on the Body Mass Index (BMI) and the Body Image Distortion questionnaire (BID). In terms of the BMI, 73.7% of aerobic instructors from the OFC registered at

Table 3

Means, (Standard Deviations), and Planned Comparisons of Female Anorexic, College (Garner & Olmsted, 1984), and OFC Members (< 28 years)

EDI Sub-scale	Means and (Standard Deviations) Anorexic Mean Age = 22.5 (5.4)	College Mean Age = 20.3 (1.6)	OFC Members Mean Age = 25.0 (2.5)	t-values Anorexic vs. OFC Members	t-values College vs. OFC Members
DT	13.8 (6.1)	5.1 (5.5)	3.9 (4.8)	15.23[D]	2.26[A]
BUL	8.1 (6.3)	1.7 (3.1)	1.2 (2.5)	12.32[D]	1.52
BD	15.5 (7.8)	9.7 (8.1)	6.6 (6.6)	10.35[D]	4.03[C]
INEFF	12.1 (8.6)	2.3 (3.8)	1.8 (5.9)	11.84[D]	.88
PERF	8.6 (5.3)	6.4 (4.3)	5.7 (8.0)	3.54[C]	.93
ID	6.4 (4.9)	2.4 (3.0)	1.5 (2.8)	10.65[D]	3.00[B]
IA	11.4 (7.0)	2.3 (3.6)	2.0 (3.2)	28.48[D]	.83
MF	5.6 (5.8)	2.2 (2.5)	1.1 (1.8)	9.00[D]	5.00[D]

[A] $p < .05$
[B] $p < .01$
[C] $p < .001$
[D] $p < .0001$

acceptable scores between 20-25, while 4.8% had scores over 25 and 21.5% had BMI scores under 20. This indicates that where there is concern among OFC members it should be underweight rather than for overweight instructors. Similarly, in terms of the Body Image Distortion questionnaire (BID) the mean percentage that the sample of women distorted was +8.5%. Indeed 86.2% of the OFC female members overestimated their body size: 47.7% mildly up to 10%; 29.3% moderately from 11-20%; 6.9% markedly from 21-30%; and 2.3% extremely in excess of 30%. Similarly in the Leichner study over one half of the subjects said they were afraid of becoming obese; 47% engaged in binge eating and 9.4% had a history of self-induced vomiting. In the Rawlings study, the younger OFC members (less than 28 years old) tended to show a higher level of body image distortion than did the older members. Furthermore, members who had a body image distortion of 20% or more tended to have higher scores on the Eating Disorder Inventory. This implies that a person's mental image of herself may be linked to a predisposition to eating disorders. Previous research indicates that a score of 20% or more may warrant careful monitoring of the individual and a score of 31% or more may be used as an indicator of eating disorders.

The results of these studies suggest that exercise participants and aerobic instructors are generally 'healthy' from an eating disorder and body image standpoint. However, there is a significant minority of underweight participants and instructors who overestimate their body size and have tendencies toward anorexia nervosa and bulimia. Further, readers should realize that is probably a conservative estimate of the problem, since the results of these studies were self-reported

and the subjects in both studies were drawn from non-commercial fitness programs with an emphasis on wellness versus competitive elitist fitness activity.

Those interested in the organization and conducting of exercise and fitness programs should be concerned by the results of these studies for three reasons:

1. It is disturbing that a Canadian female population of exercise participants and aerobic instructors, the vast majority of whom are underweight or normal weight, distort their body image, perceive themselves overweight and seek weight reduction by dieting and exercise.
2. The fact that the sample does not, in general, differ from a female Canadian population reference group should provide little reassurance, given the incidence of eating disorders in this population.
3. These studies probably provide a best-case scenario, since the exercisers and instructors were drawn from a non-profit program and professional organization, respectively. Results on more commercial and competitive programs might result in more startling results.

Those involved in promoting wellness and preventing eating disorders should be encouraged by the willingness of exercisers and instructors to be involved in these studies and readiness to receive the results. Requests received by the Bulimia and Anorexia Nervosa Association (BANA) for assistance from fitness management professionals indicate that there is a genuine concern about this problem in the fitness

community. In response to these inquiries BANA had developed a brochure on "Sports, Fitness, Health and Eating Disorders" which provides a definition and description of anorexia nervosa and bulimia, information on fitness and nutrition and additionally the suggestions contained in Tables 4-7.

It is generally acknowledged in fitness circles that to date compulsive exercise and involvement in elite or overly-competitive fitness programs has been part of the problem. However, fitness with an emphasis on wellness can be part of the solution. Exercise participants and fitness instructors are presented with a tough challenge:

1. Study the signs, symptoms and characteristics of eating disorders.
2. Develop the ability to identify and refer individuals with eating disorders to community health professionals.
3. Market and implement fitness for weight management rather than weight reduction, addressing the fact that being underweight is at least equally hazardous to your health as being overweight.
4. Incorporate fitness and related activities (dance, music, cooperative games and relaxation) as alternate stress management techniques to avoid exercise addiction.
5. Be a significant advocate of the shift from the elitist image of fitness which contributes to unrealistic goals and false body image to mass participation in a happy and healthy moderate activity program.
6. Challenge yourself to live and present yourself as a healthy role model leading a balanced life and caring for yourself as well as others.

Table 4

The Eating Disordered Versus The Athletic Female/Fitness Participant

Red flags:
- Dietary faddism
- Controlled calorie consumption
- Specific carbohydrate avoidance
- Low body weight
- Resting bradycardia and hypotension
- Increased physical activity
- Amenorrhea or oligomenorrhea
- Anemia (may or may not be present)

Distinguishing features of the athlete/fitness participant:
- Purposeful training
- Increased exercise tolerance
- Good muscular development
- Accurate body image
- Body fat level within defined normal range
- Increased plasma volume
- Increased O_2 extraction from blood
- Efficient energy matabolism
- Increased HDL_2

Distinguishing features of the athlete/exercise anorectic/bulimic:
- Aimless physical activity
- Poor or decreasing exercise performance
- Poor muscular development
- Flawed body image (believes herself to be overweight)
- Body fat level below normal range
- Electrolyte abnormalities if abusing laxatives and/or diuretics
- Cold intolerance
- Dry skin
- Cardiac arrhythmias
- Lanugo hair
- Leucocyte dysfunction

Table 5

Danger Signs for Physicians/Researchers

Anorexia Nervosa:
- Weight loss
- Social withdrawal
- Personality change
- Obsession with food, weight and dieting
- Increased compuslive exercising
- Amenorrhea (secondary or primary)

Bulimia:
- Weight loss - not extreme
- Long periods in bathroom after meals
- Multiple somatic complaints
- Binging (may alternate with fasting)
- Drug abuse - illicit, laxative, ipecac
- Amenorrhea - secondary

Danger Signs for Coaches/Fitness Instructors

Anorexia Nervosa:
- Weight loss
- Obsession with exercise
- Withdrawal, "loner"
- Concern with weight, diet, and appearance
- Overlying sense of unhappiness
- Stress fractures, shin splints, etc.
- Avoids social eating situations
- Increase in speed and endurance

Bulimia:
- Irregular weight loss
- Variable performance
- Drug abuse
- Binges
- Disappears after binges
- Multiple complaints, weakness, aches, and pains
- Minor theft - food, money, equipment

Table 6

Eating Disorders and Fitness/Aerobics Classes

N.B. Since many people suffering from eating disorders use exercise to control their weight, fitness leaders and professionals should be aware of and actively look for people with symptoms.

Fitness/Aerobic Instructors should look for:
(as well as usual signs of anorexia and bulimia)

- compulsive exercising; workouts daily or several times a day, keeping up a high pace of activity even during designated pauses
- rapid weight loss of fluctuations with continual dissatisfaction with body expressed by participant
- tired, "dragged out" facial expression
- movements appear very forced; bursting energy lacking
- frequent questions about food, diets, and weight loss; often the same question reworded
- irregular or high heart rate for bulimics
- dizziness, fainting

Fitness Appraisers should look for:

- abnormal EKG's during exercise; inverted T-waves, ST depression
- high, irregular heart rates
- should not do maximal aerobic testing
- often predisposed to heart attack due to electrolyte imbalance
- if disorder is known, get electrolytes tested before aerobic or maximal muscle strength tests

Table 7

Fitness/Aerobics Class Tips on Prevention

For Instructors:
- make your focus of class clear to the participant in question
  * you are interested only in health, not weight loss as such
- keep heart rate below 85% maximum minus resting (70% to be safe)
- if you are in a community environment, you may feel safe bringing up the topic in class either with discussion or written material

For Fitness Class Participants:
- remember health does not equal thin or weight loss
- body needs fuel to run on - just like a car. If you do an aerobics class without eating, that is like driving a car 100 miles with an empty tank of gas
- the brain needs glucose to function properly; if you exercise without eating the blood glucose is low; the muscles feel sluggish but they will use up the blood glucose and "starve" the brain. This causes black outs and dizziness.
- you should eat 1 to 2 hours before exercising to make sure food is digested somewhat
- for anorexics and bulimics carbohydrates would be best because they digest quicker than protein and fat
- focus on fun. If you enjoy exercising as much as you say you do, then you don't need to push yourself
- everyone's body needs a rest. Sometimes a week or even a month "off" of a regular exercise is rejuvenating
- avoid compulsiveness: "I've got to finish the 10K", "I've got to go to aerobics every day". Use variety and listen to what your body wants to do, not your compulsivity.

Research in the sport and athletic area has turned out a number of excellent publications which may be of interest to fitness participants, instructors and administrators. The National Intercollegiate Athletic Association (NCAA) has turned out a pamphlet on "Nutrition and Eating Disorders in College Athletes" (1991) and has also developed three audiovisual aids on nutrition and eating disorders: "Afraid to Eat: Eating Disorders in Student Athletes"; "Out of Bounds: Nutrition and Weight"; and "Eating Disorders: What Can We Do?" The Sports Medicine Council of Canada has also developed "Desperate Measures: Eating Disorders in Athletes" as an audiovisual aid. The Association for the Advancement of Health Education of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) has produced a Handbook for Coaches on Eating Disorders in Athletics, which was edited by Susan Chappell-Holliman and published by Kendall-Hunt (1991). AAHPERD has also produced Eating Disorders Among Athletes: Theory, Issues and Research, which was edited by David R. Black (1991). Similar efforts and concerns are required in the area of fitness and aerobic dance.

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